

6.3 Parametric Equations

Name _____ Date _____ Period _____

Complete the table that accompanies each pair of parametric equations.

1. $x = 4t + 1$, $y = t - 2$, for $0 \leq t \leq 3$

t	x	y
0		
1		
	7	
		1

2. $x = 3 - t$, $y = 2t + 5$, for $2 \leq t \leq 7$

t	x	y
2		
3		
	-2	
		19

3. $x = t^2$, $y = 3t - 1$, for $1 \leq t \leq 5$

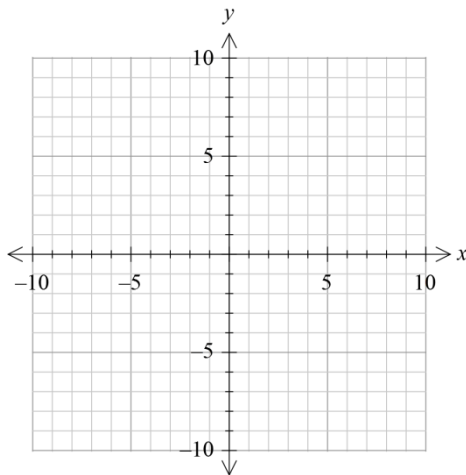
t	x	y
1		
2.5		
	5	
		11
	25	

4. $x = \sqrt{t}$, $y = t + 4$, for $0 \leq t \leq 9$

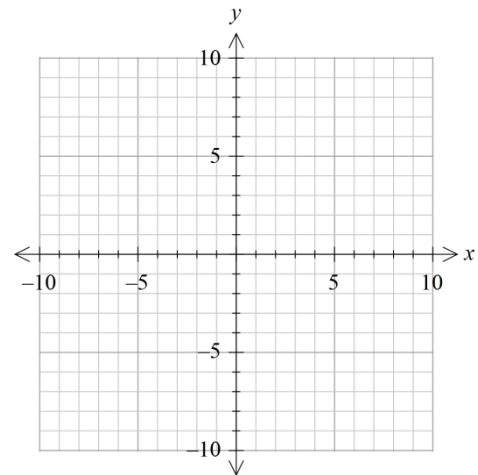
t	x	y
0		
2		
4		
		12
	3	

Graph each pair of parametric equations in the rectangular coordinate system.

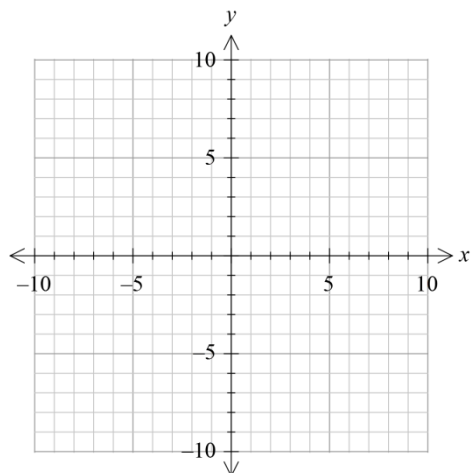
5. $x = 3t - 2$, $y = t + 3$, for $0 \leq t \leq 4$



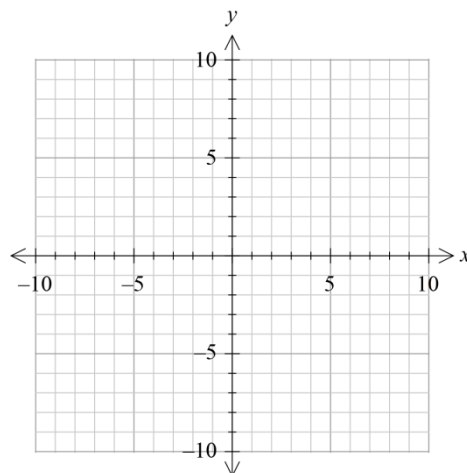
6. $x = 4 - 3t$, $y = 3 - t$, for $1 \leq t \leq 3$



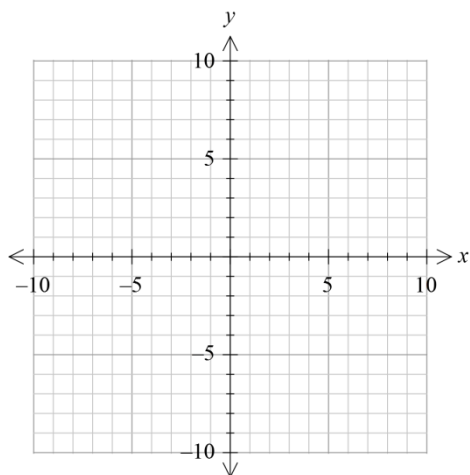
7. $x = t - 1$, $y = t^2$, for t in $(-\infty, \infty)$



8. $x = t - 3$, $y = \frac{1}{t}$, for t in $(-\infty, \infty)$



9. $x = \cos t$, $y = \sin t$



Eliminate the parameter and identify the graph of each pair of parametric equations.

10. $x = 4t - 5$, $y = 3 - 4t$

Type of graph:

11. $x = -4\sin 3t$, $y = 4\cos 3t$

Type of graph:

12. $x = 2\sin t \cos t$, $y = 3\sin 2t$

Type of graph:

13. $x = t + 4$, $y = \sqrt{t - 5}$

Type of graph:

Write a pair of parametric equations that will produce the indicated graph. (Answers may vary.)

14. The line segment starting at (2, 3) with $t = 0$ and ending at (5, 9) with $t = 2$.

15. The line segment starting at (-2, 4) with $t = 3$ and ending at (5, -9) with $t = 7$.

16. That portion of the circle $x^2 + y^2 = 4$ that lies in the third quadrant.

17. That portion of the circle $x^2 + y^2 = 9$ that lies below the x-axis.

18. The vertical line through (3, 1).

19. The circle whose polar equation is $r = 2 \sin \theta$.

The following problems involve the parametric equations for the path of a projectile.

$$x = v_0(\cos \theta)t \quad \text{and} \quad y = -16t^2 + v_0(\sin \theta)t + h_0,$$

where θ is the angle of inclination of the projectile at the launch, v_0 is the initial velocity of the projectile in feet per second, and h_0 is the initial height of the projectile in feet.

20. An archer shoots an arrow from a height of 5 ft at an angle of inclination of 30 degrees with a velocity of 300 ft/sec. Write the parametric equations for the path of the projectile and sketch the graph of the parametric equations.

21. For how many seconds is the arrow of Exercise 20 in flight?

Review

22. Write a rectangular equation that is equivalent to the polar equation $r = 8 \cos \theta$.

23. Find the trigonometric form for the complex number $3 - 3i\sqrt{3}$. Use radian measure for the argument.